ABSTRACT OF THE DISCLOSURE

The present invention provides a multi-channel tunable filter and methods for making such a filter. In one embodiment, the filter comprises a bank of gratings imprinted into a filter material, such as Lithium Niobate. In another embodiment, the filter comprises a bank of gratings imprinted on a thin-film filter. An optical read-head comprising a pair of lenses is configured to pass light from within an optical fiber carrying multiple wavelengths through an appropriate grating to extract or drop a specific wavelength. To ensure continuous data transmission, the filter is tuned to a wavelength by configuring the read-head to move in a hitless manner. In one embodiment, the gratings are recorded by the interference of two beams. A first plane wave reflects off a first mirror stack and a second plane wave reflects off a second mirror stack. In another embodiment, the gratings are recorded by a phase masking method.